

Description

WINDOW TYPE AIR CONDITIONER

Technical Field

- [1] The present invention relates to a window type air conditioner, and more particularly, to a window type air conditioner capable of reducing noise and enhancing the air volume by respectively installing a cross flow fan at an outdoor unit and an indoor unit.

Background Art

- [2] In general, an air conditioner is provided with a refrigerating cycle constituted with a compressor, a condenser, a capillary tube, a heat exchanger, etc., and properly supplies cool air generated from an evaporator and warm air generated from the condenser indoors according to the indoor condition, thereby maintaining the indoor circumstance comfortably.
- [3] The air conditioner is divided into a window type air conditioner and a separated type air conditioner according to an installation method. The window type air conditioner is installed at the window, etc. under the state that an outdoor unit and an indoor unit are integrally assembled to each other in one case, and the separate type air conditioner is respectively installed at the outdoor and the indoor under the state that the outdoor unit and the indoor unit are separated from each other.
- [4] FIG. 1 is a disassembled perspective view showing a window type air conditioner in accordance with the conventional art, and FIG. 2 is an engagement sectional view showing the window type air conditioner in accordance with the conventional art.
- [5] The conventional window type air conditioner comprises: a case 100 of which one side is positioned at the outdoor side and another side is positioned at the indoor side; an outdoor unit 110 installed at the outdoor side of the case 100 and heat-exchanged with the outdoor air; an indoor unit 120 installed at the indoor side of the case 100 and heat-exchanged with the indoor air; and a compressor 130 for compressing a refrigerant.
- [6] The case 100 is installed at the wall that divides the outdoors and the indoors, and one side of the case 100 is positioned at the outdoor side and another side thereof is positioned at the indoor side. An outdoor air suction port 102 for sucking the outdoor air is formed at both lateral surfaces of the case 100 positioned at the outdoor side. Also, an outdoor air discharge port 104 for discharging the air that has been heat-exchanged while passing through the outdoor unit 110 to the outdoor is formed at the

rear surface of the case 100. At the front surface of the case 100 positioned at the indoor side, an indoor air suction port 106 for sucking the indoor air and an indoor air discharge port 108 for discharging the air that has been heat-exchanged while passing through the indoor unit 120 to the indoor are respectively formed.

[7] The outdoor unit 110 is composed of: an outdoor heat exchanger 112 installed inside the case 100 positioned at the outdoor side and connected to the compressor 130 by a refrigerant pipe thus to be heat-exchanged with the outdoor air; and an axial fan 114 opposite to the outdoor heat exchanger 112 for generating a blowing force to suck the outdoor air and thus to discharge it to the outdoor heat exchanger 112.

[8] The outdoor heat exchanger 112 and the axial fan 114 are mounted in a shroud 116. The shroud 116 is provided with an orifice 118 for guiding the air to the axial fan 112 for a smooth suction.

[9] The indoor unit 120 is composed of: an indoor heat exchanger 122 installed inside the case 100 positioned at the indoor side for heat-exchanging the indoor air; and a centrifugal fan 124 opposite to the indoor heat exchanger 122 for generating a blowing force so that the indoor air can pass through the indoor heat exchanger 122.

[10] An orifice 134 for guiding the indoor air that has passed through the indoor heat exchanger 122 to the centrifugal fan 124 is formed between the indoor heat exchanger 122 and the centrifugal fan 124. An air guide 128 for guiding the air that has passed through the centrifugal fan 124 to the indoor air discharge port 108 is installed at the upper side of the centrifugal fan 124.

[11] A division plate 140 for dividing the outdoor unit 110 and the indoor unit 120 is installed inside the case 100, and a driving motor 142 for driving the centrifugal fan 124 and the axial fan 114 is mounted at the division plate 140.

[12] Operation of the window type air conditioner in accordance with the conventional art will be explained in more detail. When a power source is applied to the air conditioner, the compressor 130 and the driving motor 142 are driven thus to heat-exchange the outdoor air by the outdoor unit 110 and heat-exchange the indoor air by the indoor unit 120.

[13] More specifically, when the axial fan 114 is driven, the outdoor air is sucked into the case 100 through the outdoor air suction port 102. The outdoor air passes through the outdoor heat exchanger 112 thus to condense a refrigerant passing through the inside of the outdoor heat exchanger 112. Then, the outdoor air is discharged to the outdoor through the outdoor air discharge port 104.

[14] When the centrifugal fan 124 is driven, the indoor air is sucked through the indoor

air suction port 106 thus to be cooled while passing through the indoor heat exchanger 122. Then, the indoor air is discharged to the indoor through the indoor air discharge port 108.

[15] However, in the conventional window type air conditioner, the axial fan 114 is installed at the outdoor unit 110 thus to increase noise. Also, the axial fan 114 is susceptible to a channel resistance thus to decrease the air volume. In order to lower the channel resistance, a suction space 150 to which the outdoor air is sucked has to be increased. However, in that case, the entire size of the air conditioner is increased.

[16] Additionally, since the outdoor heat exchanger 112 of the outdoor unit 110 is installed only at an exit side of the axial fan 114, a heat exchange area becomes small and thereby a cooling function of the air conditioner is degraded.

Disclosure

[17] Therefore, it is an object of the present invention to provide a window type air conditioner capable of reducing noise, preventing the air volume from being lowered due to a channel resistance, and minimizing the entire size thereof by applying a cross flow fan at an outdoor unit.

[18] It is another object of the present invention to provide a window type air conditioner capable of enhancing a heat exchanging function of an outdoor heat exchanger.

[19] To achieve these objects, there is provided a window type air conditioner comprising: a case of which one side is positioned at an indoor side and another side is positioned at an outdoor side; an indoor heat exchanger mounted inside the case positioned at the indoor side thus to be heat-exchanged with the indoor air; an indoor cross flow fan for generating a blowing force so that the indoor air can pass through the indoor heat exchanger and for sucking the indoor air in a circumferential direction thereof and thereby discharging the indoor air in the circumferential direction thereof; an outdoor heat exchanger mounted inside the case positioned at the outdoor side thus to be heat-exchanged with the outdoor air; and an outdoor cross flow fan for generating a blowing force so that the outdoor air can pass through the outdoor heat exchanger and for sucking the outdoor air in a circumferential direction thereof and thereby discharging the outdoor air in the circumferential direction thereof.

[20] A compressor for compressing a refrigerant into a high temperature and a high pressure is installed at one side of the outdoor heat exchanger. As the compressor, a horizontal type compressor that a driving unit and a refrigerant compression unit are horizontally arranged is applied.

- [21] The indoor cross flow fan is composed of: a hub arranged in a longitudinal direction of the indoor heat exchanger and connected to the driving motor; and a plurality of blades formed at the outer circumferential surface of the hub with a certain interval and arranged in a longitudinal direction of the indoor heat exchanger.
- [22] The outdoor heat exchanger is composed of: a first outdoor heat exchanger installed at the inner side surface of the outdoor air suction port thus to be heat-exchanged with the outdoor air sucked through the outdoor air suction port; and a second outdoor heat exchanger installed at the inner side of the outdoor air discharge port thus to be heat-exchanged with the outdoor air discharged to the outdoor air discharge port.
- [23] A window type air conditioner according to the present invention comprises: a case of which one side is positioned at an indoor side and another side is positioned at an outdoor side; an indoor heat exchanger mounted inside the case positioned at the indoor side thus to be heat-exchanged with the indoor air; a centrifugal fan for generating a blowing force so that the indoor air can pass through the indoor heat exchanger; an outdoor heat exchanger mounted inside the case positioned at the outdoor side thus to be heat-exchanged with the outdoor air; and a cross flow fan for generating a blowing force so that the outdoor air can pass through the outdoor heat exchanger and for sucking the outdoor air in a circumferential direction thereof and thereby discharging the outdoor air in the circumferential direction thereof.

Description of Drawings

- [24] FIG. 1 is a disassembled perspective view showing a window type air conditioner in accordance with the conventional art;
- [25] FIG. 2 is a sectional view showing the window type air conditioner in accordance with the conventional art;
- [26] FIG. 3 is a disassembled perspective view showing a window type air conditioner according to one embodiment of the present invention;
- [27] FIG. 4 is a sectional view showing the window type air conditioner according to one embodiment of the present invention;
- [28] FIG. 5 is a sectional view showing a mounting position of an outdoor cross flow fan and an indoor cross flow fan according to one embodiment of the present invention; and
- [29] FIG. 6 is a sectional view showing a structure of an outdoor unit according to one embodiment of the present invention.

Best Mode

- [30] Hereinafter, preferred embodiments of a window type air conditioner according to the present invention will be explained with reference to the attached drawings.
- [31] Even if a plurality of preferred embodiments may exist in the present invention, the most preferred embodiment will be explained hereinafter.
- [32] FIG. 3 is a disassembled perspective view showing a window type air conditioner according to one embodiment of the present invention, and FIG. 4 is a sectional view showing the window type air conditioner according to one embodiment of the present invention.
- [33] The window type air conditioner according to the present invention comprises: a case 10 arranged at a wall that divides an indoor side and an outdoor side and of which one side is positioned at an indoor side and another side is positioned at an outdoor side; an indoor unit 20 arranged at the indoor side of the case 10 thus to be heat-exchanged with the indoor air; an outdoor unit 30 arranged at the outdoor side of the case 10 thus to be heat-exchanged with the outdoor air; a compressor 40 for compressing a refrigerant into a gaseous refrigerant of a high temperature and a high pressure; and etc.
- [34] As the compressor, a horizontal type compressor that a driving unit and a refrigerant compression unit are horizontally arranged is applied.
- [35] An indoor air suction port 12 for sucking the indoor air is formed at the front surface of the case 10 positioned at the indoor side, and an indoor air discharge port 14 for discharging the air that has been heat-exchanged while passing through the indoor unit 20 to the indoor is formed at the upper surface of the case 10 positioned at the indoor side.
- [36] An outdoor air suction port 16 for sucking the outdoor air is formed at the rear surface of the case 10 positioned at the outdoor side, and an outdoor air discharge port 18 for discharging the air that has passed through the outdoor unit 30 to the outdoor is formed at the upper surface of the case 10 positioned at the outdoor side.
- [37] The indoor unit 20 is composed of: an indoor heat exchanger 22 for passing the indoor air and cooling; and an indoor cross flow fan 24 arranged at the inner side of the indoor heat exchanger 22 for generating a blowing force so that the indoor air sucked into the indoor air suction port 12 can pass through the indoor heat exchanger 22.
- [38] The indoor heat exchanger 22 is formed as a rectangular parallelepiped shape arranged at the inner side of the indoor air suction port 12. Since the indoor air suction port 12 is formed to almost occupy the front surface of the case 10, the indoor air

suction port 12 is formed to have the same area as the indoor heat exchanger 22 in order to increase a heat exchanging area.

- [39] The indoor cross flow fan 24 is a fan for sucking the indoor air in the circumferential direction thereof and discharging the indoor air in the circumferential direction thereof. The indoor cross flow fan 24 sucks the indoor air in the lateral direction thereof through the indoor air suction port 12, and then discharges the indoor air in the upper direction thereof through the indoor air discharge port 14 arranged to be perpendicular to the indoor air suction port 12.
- [40] Herein, the centrifugal fan explained in the conventional art can be applied instead of the indoor cross flow fan 24.
- [41] The indoor cross flow fan 24 is composed of: a hub 26 arranged in a longitudinal direction of the indoor heat exchanger 22 and connected to the driving motor 42; and a plurality of blades 28 formed at the outer circumferential surface of the hub 26 with a certain interval and arranged in a longitudinal direction of the indoor heat exchanger 22.
- [42] In order to divide a suction side and a discharge side of the indoor cross flow fan 24, a stabilizer 44 having approximately 45 ° is installed between the indoor air suction port 12 and the indoor air discharge port 14.
- [43] The indoor cross flow fan 24 is mounted in the case 10 positioned at the indoor side, and a guide panel 46 for guiding the indoor air sucked into the indoor air suction port 12 to the indoor air discharge port 14 is provided at the case 10 positioned at the indoor side.
- [44] The outdoor unit 30 is composed of: a first outdoor heat exchanger 32 heat-exchanged with the outdoor air sucked through the outdoor air suction port 16 positioned at the indoor side; a second outdoor heat exchanger 34 heat-exchanged with the outdoor air discharged through the outdoor air discharge port 18; and an outdoor cross flow fan 36 for generating a blowing force so that the outdoor air can be sucked and thereby to pass through the first and second outdoor heat exchangers 32 and 34.
- [45] The first outdoor heat exchanger 32 is vertically formed to occupy up the rear surface of the case 10 thereby to be heat-exchanged with the outdoor air sucked through the outdoor air suction port 16 formed at the rear surface of the case. Also, the second outdoor heat exchanger 34 is horizontally arranged at the upper surface of the case 10 positioned at the outdoor side thereby to be heat-exchanged with the outdoor air discharged through the outdoor air discharge port 18 formed at the upper surface of the case 10.

- [46] The outdoor cross flow fan 36 sucks the air in the circumferential direction thereof and then discharges the air in the circumferential direction thereof. The outdoor cross flow fan 36 is installed in a longitudinal direction of the first and second outdoor heat exchangers 16 and 18, thereby sucking the outdoor air in the lateral direction thereof and then discharging the outdoor air in the upper direction thereof.
- [47] The outdoor cross flow fan 36 is composed of: a hub 52 connected to a driving motor 50 at one side thereof for receiving a rotational force; and blades 54 arranged at the outer circumferential surface of the hub 52 with a certain interval and long arranged along the longitudinal direction of the hub 52.
- [48] A guide panel 56 for guiding the outdoor air sucked in the lateral direction to be discharged to the upper direction is installed at a lateral surface of the outdoor cross flow fan 36. Also, a stabilizer 58 for dividing a suction side and a discharge side of the outdoor cross flow fan 36 is installed between the first outdoor heat exchanger 32 and the second outdoor heat exchanger 34. The stabilizer 58 is preferably installed with approximately 45 °.
- [49] As shown in FIGs. 5 and 6, the rotation center of the outdoor cross flow fan 36 is positioned at a lower side than the indoor cross flow fan 24 with a certain distance h, so that the edge of the blade 54 is in contact with condensing water collected at the lower portion of the case 10 positioned at the outdoor side thus to spray the condensing water.
- [50] That is, when the outdoor cross flow fan 36 is rotated, the blade 54 contacting the condensing water lifts up the condensing water. According to this, the condensing water is sprayed to the first and second outdoor heat exchangers 32 and 34 thus to lower the temperature of the first and second outdoor heat exchangers 32 and 34.
- [51] Operation of the window type air conditioner will be explained as follows.
- [52] When a power source is applied to the air conditioner, the compressor 40 is driven thus to cool the refrigerant, the indoor cross flow fan 24 is driven thus to heat-exchange the indoor air by the indoor heat exchanger 22, and the outdoor cross flow fan 36 is driven thus to heat-exchange the outdoor heat exchangers 32 and 34 with the outdoor air.
- [53] At this time, the indoor unit 20 is operated as follows. When the indoor cross flow fan 24 is driven as the power source is applied to the driving motor 42, the indoor air is sucked into the case 10 through the indoor air suction port 12 formed at the front side of the case 10 thus to be cooled while passing through the indoor heat exchanger 22. The cooled air is guided by the air guide 46 thus to be discharged to the indoor side

through the indoor air discharge port 14 formed at the upper side of the front side of the case 10.

[54] Also, the outdoor unit 30 is operated as follows. When the outdoor cross flow fan 36 is driven as the power source is applied to the driving motor 50, the outdoor air is sucked into the case 10 through the outdoor air suction port 16 formed at the rear surface of the case 10. The outdoor air is heat-exchanged while passing through the first outdoor heat exchanger 32. Then, the outdoor air that has passed through the first outdoor heat exchanger 32 is moved to the upper side of the case 10 along the air guide 56, and passes through the second outdoor heat exchanger 34 thus to be secondarily heat-exchanged. Then, the outdoor air is discharged to the outdoor side through the outdoor air discharge port 18 formed at the upper side of the case 10.

[55] At this time, the blade 54 of the outdoor cross flow fan 36 is in contact with condensing water stored at the lower portion of the case 10 thus to lift up the condensing water when the outdoor cross flow fan 36 is rotated and thereby to spray the condensing water to the first outdoor heat exchanger 32 and the second outdoor heat exchanger 34. According to this, the temperature of the first and second outdoor heat exchangers is lowered.

[56] In the window type air conditioner according to the present invention, noise of the air condition is reduced and the air volume is increased even if the channel resistance is increased by applying the outdoor cross flow fan at the outdoor unit, thereby enhancing the function of the air conditioner.

[57] Also, since the outdoor cross flow fan can have a diameter smaller than that of an axial fan and the horizontal type compressor is applied, the entire size of the air conditioner is minimized and the height of the air conditioner is lowered.

[58] Additionally, the first and second outdoor heat exchangers are applied to the outdoor unit thus to increase the heat exchanging area and thereby to enhance the function of the air conditioner.

[59] In addition, since the outdoor cross flow fan sprays condensing water by lifting up the condensing water, an additional component for spraying condensing water is not necessary. Also, the temperature of the first and second heat exchangers is lowered thus to enhance the function of the heat exchanger.

[60] It will be apparent to those skilled in the art that various modifications and variations can be made in the present invention without departing from the spirit or scope of the invention. Thus, it is intended that the present invention cover modifications and variations of this invention provided they come within the scope of the

appended claims and their equivalents.